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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/698,246	10/30/2000	Dengwei Fu	1997.0010002	6241

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EXAMINER
DO, CHAT C

ART UNIT	PAPER NUMBER
2124	

DATE MAILED: 06/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

	Application No.	Applicant(s)
Office Action Summary	09/698,246	FU ET AL.
	Examiner	Art Unit
	Chat C. Do	2124

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>10/30/00; 12/26/00; 02/22/01</u> .

2a) ☐ This action is **FINAL**.　　2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-45</u> is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☒ Claim(s) <u>26-34 and 45</u> is/are allowed.

6) ☒ Claim(s) <u>1, 3-4, 8-14, and 35-36</u> is/are rejected.

7) ☒ Claim(s) <u>5-7, 15-25 and 37-44</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

　　If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a) ☐ All　b) ☐ Some * c) ☐ None of:

　　　　1. ☐ Certified copies of the priority documents have been received.

　　　　2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

　　　　3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

　　a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

Specification

1.   Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because the abstract exceeds 150 words in length. Correction is required. See MPEP § 608.01(b).

2.   Claim 14 is objected to because of the following informalities: the phrase "an binary" in line 1 should be "a binary". Appropriate correction is required.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 1, 4, 9, 12-14, and 35-36 are rejected under 35 U.S.C. 103(a) as being obvious over Mayer (U.S. 4,340,939).

Re claim 1, Mayer discloses in Figure 2 an angle rotator for rotating an

input number to produce a rotated number (col. 1 lines 12-19) according to an

input angle θ (A = A_1 + A_2), angle rotator comprising: a memory that stores a sin

θ_M value and a cos θ_M value (48 in Figure 5), wherein θ_M is a coarse

approximation to input angle θ_M (E($A_1{}'$) or the two MSB to 20); a first digital

circuit (20) that performs a coarse rotation on input number based on sin θ_M value

and cos θ_M value (col. 3 lines 54-59 wherein the coarse increment adjustment is

45°), resulting in an intermediate number (E(X_2) and E(Y_2)); a fine adjustment

circuit (22) that generates a fine adjustment value based on a 0_L value, wherein θ_L

= θ - θ_M (E($A_2{}'$)); and a second digital circuit (22) that performs a fine rotation on

intermediate number based on fine adjustment value, resulting in the rotated

number (col. 1 lines 50-52). Mayer does not disclose the input number is either a

real or a complex number. However, the examiner takes an official notice that the

coordinate input vector in communication (phase) for rotating a desired angle is a

complex number including the real part and imaginary part. Therefore, it would

have been obvious to a person having ordinary skill in the art at the time the

invention is make to include the input complex number in the Mayer's invention

because it would enable to simplify the hardware and improve the performance

for rotating at a desire angle.

Re claim 4, Mayer further discloses a second digital circuit (22) is a

butterfly circuit having a plurality of multipliers (120 and 122 in Figure 6) that

multiply intermediate number by fine adjustment value.

Re claim 9, Mayer discloses in Figure 2 an angle rotator for rotating an input number to produce a rotated number according to an input angle θ_M, angle rotator comprising: a memory that stores one or more values that are indexed by a most significant word (MSW) of input angle ($E(A_1)$), including a first value that is an approximation of a $\sin \theta_M$ value, and a second value that is an approximation of a $\cos \theta_M$ value (equations 1-3), wherein θ_M is a radian angle that corresponds to MSW of the input angle (first two bits of E(A)), and one or more error values that represent one or more quantization errors associated with at least one of first value and second value (col. 5 lines 57-68 and col. 6 lines 5-10); a first digital circuit (20) that performs a coarse rotation on input number based on first value (first two MSB) and second value, resulting in intermediate number ($E(X_2)$ and $E(Y_2)$); and a second digital circuit (22) that performs a fine rotation on intermediate number based on one or more error values, resulting in the rotated number. Mayer does not disclose the input number is either a real or a complex number. However, the examiner takes an official notice that the coordinate input vector in communication (phase) for rotating a desired angle is a complex number including the real part and imaginary part. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is make to include the input complex number in the Mayer's invention because it would enable to simplify the hardware and improve the performance for rotating at a desire angle.

Re claim 12, Mayer further discloses one or more quantization errors reflect finite memory storage for first and second values (col. 2 lines 10-17).

Re claim 13, Mayer further discloses first value includes a memory quantization error relative to $\sin \theta_M$ value (θ_M is only the first two MSB of the input angle θ).

Re claim 14, Mayer further discloses first value is a binary n-bit approximation of $\sin \theta_M$ value wherein n is a bit storage capacity for first value in memory (48 and 25 $E(Y_2)$).

Re claim 35, Mayer discloses a method of rotating an input number according to an input angle θ_M, the method comprising the steps of (1) receiving the input number ($E(X_1)$ and $E(Y_1)$); (2) determining a first value that is an approximation of $\sin \theta_M$ (48) and determining a second value that is an approximation of $\cos \theta_M$ (48), wherein θ_M is a radian angle that corresponds to a most significant word (MSW) of the input angle θ (first two MSB of input angle); and (3) rotating input number in a plane based on first value and second value to generate a rotated number, whereby rotated number is data processed by digital device (Figure 1 and col. 1 lines 15-20). Mayer does not disclose the input number is either a real or a complex number. However, the examiner takes an official notice that the coordinate input vector in communication (phase) for rotating a desired angle is a complex number including the real part and imaginary part. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is make to include the input complex number in the Mayer's invention because it would enable to simplify the hardware and improve the performance for rotating at a desire angle.

Re claim 36, Mayer further discloses in Figure 5 step of determining

comprises the step of retrieving first value and second value from a memory (48).

5.   Claims 3, 8, and 10-11 are rejected under 35 U.S.C. 103(a) as being obvious over

Mayer (U.S. 4,340,939) in view of Fox et al. (U.S. 5,276,633).

Re claim 3, Mayer does not disclose first digital circuit is a butterfly

circuit having a plurality of multipliers that multiply input number by $\sin \theta_M$ value

and $\cos \theta_M$ value. However, Fox et al. disclose in Figure 3 a circuit is a butterfly

circuit having a plurality of multipliers that multiply input number by $\sin \theta_M$ value

and $\cos \theta_M$ value (col. 10 lines 51-55). Therefore, it would have been obvious to

a person having ordinary skill in the art at the time the invention is made to

include a plurality of multipliers that multiply input number by $\sin \theta_M$ value and

$\cos \theta_M$ value as disclosed in Fox et al.'s invention to Figure 2 of Mayer because it

would enable to increase simplify and increase the system performance.

Re claim 8, Mayer does not disclose that the ROM is indexed by θ_M.

However, Fox et al. disclose in Figure 3 that the ROM is indexed by θ_M (311 and

312). Therefore, it would have been obvious to a person having ordinary skill in

the art at the time the invention is made to replace the PROM in Mayer as ROM

in Fox et al. because it would enable to retrieve the parameters faster and reduce

the power consumption.

Re claim 10, it has the same limitation as cited in claim 3. Thus, claim 10

is also rejected under the same rationale in the rejection of rejected claim 3.

Re claim 11, it has the same limitation as cited in claim 3. Thus, claim 11 is also rejected under the same rationale in the rejection of rejected claim 3.

Allowable Subject Matter

6.   Claims 26-34 and 45 are allowed.

7.   Claims 5-7, 15-25, and 37-44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

8.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a.   U.S. Patent No. 3,646,337 to Bifulco discloses an apparatus for processing angular data.

b.   U.S. Patent No. 3,974,367 to Mayer discloses a solid-state resolver apparatus.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (703) 305-5655. The examiner can normally be reached on M => F from 7:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (703) 305-9662. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the receptionist whose telephone number is (703) 305-

3900.

Chat C. Do
Examiner
Art Unit 2124

May 30, 2003

CHUONG DINH NGO
PRIMARY EXAMINER